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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/674,037

09/29/2003

Tatsuo Maeno

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EXAMINER

NOGUEROLA, ALEXANDER STEPHAN

ART UNIT

PAPER NUMBER

1753

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

04/05/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/674,037

Applicant(s)

MAENO ET AL.

Examiner

ALEX NOGUEROLA

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-13 is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,8 and 9 is/are rejected.
- 7) ☒ Claim(s) 3,6 and 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/14/2003</u> . | 6) <input checked="" type="checkbox"/> Other: <u>IDS of 9/29/2003</u> .                |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 2, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Willatt (GB 2235050) ("Willatt").

Addressing claim 1, Willatt discloses an electrochemical sensor including a base member (25) which has a porous, sheet-like shape and is hydrophobic as well as gas permeable (page 5:7-15 and Drawings 1, 3, and 4);

a detection electrode (36) which is included in the base member and contains a catalyst and hydrophobic resin (page 5:9-10); and

a reference electrode and a counter electrode (37), each of which contains a catalyst and hydrophobic resin (page 5:28-29; page 5: last paragraph on the page, bridging to page 6; and page 6, third full paragraph; and page 5:9-10).

Willatt does not mention providing an electrolytic solution retainer which has a

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sheet-like shape and is hydrophilic as well as electrically insulating, the electrolytic solution retainer being provided with either one of or both the reference electrode and the counter electrode. However, it would have been obvious to one with ordinary skill in the art at the time of the invention that element 39, although not described, is such an electrolytic solution retainer.

Element 38 is an electrolytic solution retainer which has a sheet-like shape and is hydrophilic as well as electrically insulating, the electrolytic solution retainer being provided with the working electrode. See Figure 1 and page 7:02-04. As seen in Figure 1 the working electrode sandwich arrangement of layers 25, 26, 38 is mirrored by the counter/reference electrode arrangement of 30, 37, 39. Because of the symmetry in the arrangement of the working electrode arrangement and the counter/reference electrode arrangement one with ordinary skill in the art would expect similar purposes for the corresponding layers. For example, since layer 25 functions as a membrane, layer 30 would be expected to function as a member (which Willatt discloses that it does). Since layer 36 functions as an electrode, layer 37 would be expected to function as counter electrode and reference electrode (which Willatt discloses that it does). Since layer 38 functions as an electrolytic solution retainer, layer 39 would also be expected to function as an electrolytic solution retainer. Indeed, arguably layer 39 must function as an electrolytic solution retainer since it directly contacts the electrolyte wick (35) (as does layer 38) and is between the electrolyte wick and layer 37, which functions as counter electrode and a reference electrode. If layer 39 did not function as an electrolytic solution retainer, as its mirror image 38, does than there is no other apparent way for

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electrolyte to reach the counter electrode and reference electrode 37 and thus the gas sensor would not be able to operate since the half-cells (working electrode and counter electrode) would be isolated from each other.

Addressing claim 2, for the additional limitation of this claim see Figure 1 and note that the split counter electrode and reference electrode layer (37) is directly situated underneath the electrolytic solution retainer (39).

Addressing claim 4, for the additional limitation of this claim see page 6:10-13.

5. Claims 5, 8, and 9 are rejected under 35 U.S.C. 103(a) as being anticipated by Dodgson et al. (WO 99/24826 A1) ("Dodgson") in view of Willatt (GB 2235050) ("Willatt") and Kirk-Othmer Encyclopedia of Chemical technology, fourth edition, Volume 9, pages 90-95)("Kirk-Othmer").

Addressing claim 5, Dodgson discloses an electrochemical sensor including:

a case (2 – Figure 10) having an electrolytic solution storage (4 – page 23:20-22);

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a cap (5) adapted to be fitted to the case (Figure 10);

a cell adapted to be contained in the case (Figure 1) by means for the cap and including:

a base member (12) which has a porous, sheet-like shape and is hydrophobic as well as gas permeable (Figure 10 and page 24:01-03),

a detection electrode (8) which is included in the base member and contains a catalyst and hydrophobic resin (page 24:first paragraph),

a counter electrode (9) which contains a catalyst and hydrophobic resin (page 24:16-19 and page 24:06-09); and

an electrolytic solution retainer (13) which has a sheet-like shape (Figure 10) and is hydrophilic as well as electrically insulating (page 24:11-12 and page 25:15-21); and

electrode pins (17) which are included in the case and adapted to be connect to the cell (Figure 10).

Dodgson does not mention providing a separate reference electrode, the counter electrode implicitly functions as a counter/reference electrode.

Willatt discloses an electrochemical gas sensor which may comprise a combined counter/reference electrode (two-electrode cell) or a reference electrode separate from the counter electrode (three-electrode cell). See page 01:third full paragraph.

It would have been obvious to one with ordinary skill in the art at the time of the invention to provide a separate reference electrode as taught by Willatt in the invention of Dodgson because as taught by Willatt the reference electrode will establish "... a

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fixed potential relative to which the working electrode can be biased.” See the last sentence in the third paragraph on page 1 of Willatt. As stated in Kirk-Othmer, “Because the reference electrode carries no current, but merely measures a potential relative to the working electrode, its stability is not unduly influenced by the electrolysis.” See the second sentence on page 95.

Addressing claim 8, for the additional limitation of this claim see in Dodgson page 24, the second paragraph.

Addressing claim 9, for the additional limitation of this claim note element 16 in Figure 10 of Dodgson and see the third full paragraph on page 24.



***Allowable Subject Matter***

6. Claims 3, 6, and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. Claims 10-13 are allowed.

8. The following is a statement of reasons for the indication of allowable subject matter:

a) Claim 3: the combination of limitations requires the reference electrode to be formed on one of the planar surfaces of the electrolytic solution retainer, and the counter electrode to be formed on the other planar surface of the electrolytic solution retainer.

In Willatt although the reference electrode and the counter electrode are in intimate contact with the electrolytic solution retainer (39), they are formed as thin films that are heated and fused onto the same surface of a membrane (30). See page 6:13-16 and page 5:third full paragraph.

b) Claim 6: the combination of limitations requires "... at least one post element that is located inside the electrolytic solution storage of the case and provided with one or more grooves adapted to guide the electrolytic solution contained in the electrolytic solution storage to the electrolytic solution retainer of the cell." In Dodgson, the post elements (13a) are cylindrical. See page 25:08-09.

c) Claim 7: the combination of limitations requires "... a plurality of post elements adapted to support the cell, which is contained in the electrolytic storage of the case, and one or more of said post elements are provided with grooves adapted to guide the electrolytic solution contained in the electrolytic solution storage to the electrolytic solution retainer of the cell." In Dodgson, the post elements (13a) are cylindrical and are not adapted to support the cell, but transport electrolyte to the electrodes. See page 25:09-21 and Figure 10.

d) Claim 10: the combination of limitations requires each electrode pin to have "... a contact portion adapted to secure each respective one of said electrodes, i.e. the detection electrode, the reference electrode, or the counter electrode, in the case or the cap in such a state as to be in contact with the electrode, a lead portion that is drawn out of either the case or the cap, wherein the contact portion

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and the lead portion of each electrode pin is formed as a seamless, integral body.”

In Dodgson each electrode pin comprises a lead portion (17) that is made of an unspecified material, presumably metal, that is especially made not integral with the contact portion (18), which is made of an electrically conductive polymer layer in order to protect the lead portion against electrolytic corrosion by the electrolyte. See the first paragraph on page 25.

e) Claims 11-13 depend from allowable claim 10.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEX NOGUEROLA whose telephone number is (571) 272-1343. The examiner can normally be reached on M-F 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NAM NGUYEN can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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Primary Examiner  
AU 1753  
April 2, 2007